REMARKS

Claims 1-17 are pending in the present application. In the Office Action mailed May 3, 2005, the Examiner rejected claims 1-2 and 5-6 under 35 U.S.C. §102(e) as being anticipated by Ishihara et al. (USP 5,916,161). Applicant appreciates the indication that claims 3, 4, and 7-17 are allowed.

In the rejection of claims 1-2 and 5-6 the Examiner relied upon Ishihara et al. The reference is directed to an MRI apparatus that has a temperature measurement function. In particular, the reference discloses an MRI apparatus that applies a pulse sequence that acquires phase information associated with a temperature change in an interior of a body to be examined. See Abstract. In this regard, "when the temperature increase due to the RF magnetic field is recognized, or when it can be predicted from a time series change of the temperature increase that the temperature increase is going to exceed the tolerable value by the further execution of the pulse sequence, it is possible to apply the measure to stop the execution of the pulse sequence or to interrupt the apparatus, so that it is possible to secure the safety of a body to be examined." Col. 14, lns. 3-12. Thus, when an overheated condition is detected or predicted, "an operator enters an input on an Input terminal or a mouse Input on a window level to generate a pulse sequence stop signal. This signal is then outputted to the sequence controller 19, and the sequence controller 19 is stopped." Col. 14, lns. 41-45. Accordingly, the reference discloses the acquisition of temperature data during the application of a given pulse sequence, determining if an overheated condition is present or likely to result, and terminating the given pulse sequence if an overheated condition is presented or likely. Thus, with the system of Ishihara et al., a pulse sequence is implemented, temperature data is acquired, and if a problem arises, the sequence is terminated.

In this regard, Ishihara et al. teaches that "when the same pulse sequence as that which caused the temperature increase resulting in the stopping of the apparatus is re-executed under the same condition. it is expected that the temperature increase will be caused again provided that a body to be examined is in the same state as before." Col. 16, lns. 20-25. As such, "It is possible to apply the measure to cool a body to be examined, but it is preferable to optimize the pulse sequence according to the measured temperature data." Col. 16, lns. 25-28. Optimization can be achieved "by changing parameters of the pulse sequence to be executed next time according to the reference values and the desired data measurement time regarding the parameters which exceeded the apparatus stopping judgement criteria." Col. 16, lns. 30-34. When changing the pulse sequence, "the first things to do is to suppress the pulse power and to increase the pulse

application time span." Col. 16, lns. 35-37. In this regard, Ishihara et al. further teaches that "it is also possible to reduce a number of RF pulses to be applied, or to widen the RF pulse application interval." Col. 16, lns. 37-39. From the text of the reference as a whole, it is clear that the "pulse" and "pulse power" referred to in lines 35-37 correspond to an RF pulse and not a gradient pulse.

That is, the reference states that "in order to make sure to stop the application of the RF magnetic fields on a living body, the output of the transmission amp (RF amp) 17 is blocked." Col. 14, lns. 46-49. The reference further teaches, "In a case of changing the RF pulse power, etc., automatically, it is necessary that an operator enters the current RF pulse input power (input voltage), application interval, application period, and pulse waveform, or these factors are measured automatically, or else these factors are read out from a file storing these factors in advance." Col. 16, lns. 55-60.

Additionally, in the Background of the Invention section of the reference, Ishihara et al. goes to great length to expound upon the effects of the application of RF power onto a living body. Specifically, Ishihara et al. states "when many RF magnetic fields are applied according to this imaging method, a temperature inside a living body increases due to the induced heating phenomenon." Col. 1, lns. 20-23. Therefore, it is clear from the context of the application, that Ishihara et al. teaches immediate termination of a given pulse sequence when an overheated condition is present or predicted and either re-application of the same pulse sequence after a cooling period or adjustment of the RF pulses of the pulse sequence to generate a new pulse sequence that is applied after a cooling period.

In contrast, claim 1 is directed to a thermal control system that has "a thermal controller adapted to set at least one dynamic limit on a power input into at least one gradient coil of the MRI, said at least one dynamic limit being a function of the initial bore condition and the thermal boundary condition." In other words, the thermal controller is configured to dynamically and smartly set a limit on the power that can be applied to a gradient coil of an MRI apparatus. One skilled in the art will appreciate that a gradient coil is a wire conductor that is used to produce a linear magnetic field, i.e., gradient magnetic field, that is superimposed on the main magnetic field. Thus, the gradient pulse, indicative of the driving of the gradient coil, is not the same as the RF pulse referenced by Ishihara et al. The "pulse power" referenced by Ishihara et al. is directed to the amount of RF energy that is deposited within the imaging volume. Gradient pulse power, on the other hand, is indicative of the strength of the gradient magnetic field that is superimposed on the main magnetic field. Accordingly, contrary to the conclusion of the

Examiner, Ishihara et al. fails to teach or suggest a thermal controller that sets a dynamic limit on the power input to a gradient coil of an MR system that is a function of an initial bore temperature and a thermal boundary condition, as called for in claim 1. Therefore, it is believed that claims 1-2 and 5-6 call for subject matter that is patentably distinct from that disclosed by Ishihara et al.

Therefore, in light of at least the foregoing, Applicant respectfully believes that the present application is in condition for allowance. As a result, Applicant respectfully requests timely issuance of a Notice of Allowance for claims 1-17.

Applicant appreciates the Examiner's consideration of these Remarks and cordially invites the Examiner to call the undersigned, should the Examiner consider any matters unresolved.

Respectfully submitted,

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